

- Predicting
- Identifying variables
- Analyzing and interpreting

## Suspended Spring

Tape a plastic cup to one end of a short section of a large-diameter spring, such as a Slinky™. Hold the other end of the spring high enough so that the plastic cup is at least 1 m above the floor. Before you release the spring, predict the exact motion of the cup from the instant that it is released until the moment that it hits the floor. While your partner watches the cup closely from a kneeling position, release the top of the spring. Observe the motion of the cup.



## Analyze and Conclude

1. Describe the motion of the cup and the lower end of the spring. Compare the motion to your prediction and describe any differences.
2. Is it possible for any unsupported object to be suspended in midair for any length of time? Create a detailed explanation to account for the behaviour of the cup at the moment at which you released the top of the spring.
3. Athletes and dancers sometimes seem to be momentarily suspended in the air. How might the motion of these athletes be related to the spring's movement in this lab?

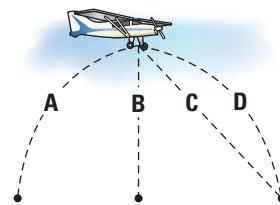
## Thought Experiments

Without discussing the following questions with anyone else, write down your answers.

1. Student A and Student B sit in identical office chairs facing each other, as illustrated. Student A, who is heavier than Student B, suddenly pushes with his feet, causing both chairs to move. Which of the following occurs?
  - (a) Neither student applies a force to the other.
  - (b) A exerts a force that is applied to B, but A experiences no force.
  - (c) Each student applies a force to the other, but A exerts the larger force.
  - (d) The students exert the same amount of force on each other.



2. A golf pro drives a ball through the air. What force(s) is/are acting on the golf ball for the *entirety* of its flight?
  - (a) force of gravity only
  - (b) force of gravity and the force of the “hit”
  - (c) force of gravity and the force of air resistance
  - (d) force of gravity, the force of the “hit,” and the force of air resistance
3. A photographer accidentally drops a camera out of a small airplane as it flies horizontally. As seen from the ground, which path would the camera most closely follow as it fell?



## Analyze and Conclude

Tally the class results. As a class, discuss the answers to the questions.